

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 2 of 11

Attorney's Docket No.: 07844-311001 / P287

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-3. (Cancelled)

4. (Currently Amended) A method for preparing a region of an electronic document for printing on a printing system having asymmetric misregistration behavior ~~The method of claim 1, further comprising:~~

defining an asymmetric transformation;
applying the asymmetric transformation to the region to generate a transformed region;
processing the transformed region to generate transformed traps; ~~and~~
applying an inverse transformation to the transformed traps to generate traps for the region, the inverse transformation being an inverse of the asymmetric transformation; and using the traps generated for the region to trap the region asymmetrically to compensate for asymmetric misregistration behavior.

5. (Original) The method of claim 4, wherein the asymmetric transformation is defined as a transformation matrix and the inverse transformation is defined as a matrix inverse of the transformation matrix.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 3 of 11

Attorney's Docket No.: 07844-311001 / P287

6. (Original) The method of claim 4, wherein defining the asymmetric transformation comprises:

obtaining a first trap width magnitude and direction, the first trap width being a minimum trap width for the printing system;

obtaining a second trap width magnitude and direction, the second trap width being a maximum trap width for the printing system;

defining a rotational component of the asymmetric transformation by determining an angle by which a first axis of a device space has to be rotated to be aligned with the first trap width direction; and

defining a scaling component of the asymmetric transformation according to a ratio of the first trap width magnitude and the second trap width magnitude.

7. (Original) The method of claim 6, wherein the electronic document is represented in a page description language in a user space and the traps for the region are represented in a device space, the method further comprising:

mapping the traps from device space to user space and adding the mapped traps to the page description language representation of the electronic document.

8. (Original) The method of claim 6, wherein the first trap width direction and the second trap width direction are at right angles to each other.

9. (Original) The method of claim 6, wherein defining the asymmetric transformation maps a first trap width vector and a second trap width vector to orthonormal basis vectors of a trap-engine space.

10. (Original) The method of claim 4, wherein processing the transformed region to generate transformed traps is done by a trap engine generating symmetric traps in a trap-engine space.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 4 of 11

Attorney's Docket No.: 07844-311001 / P287

11. (Original) The method of claim 4, wherein the step of applying the inverse transformation maps the transformed traps from a trap-engine space to a device space.
12. (Original) The method of claim 4, wherein the electronic document is represented in a page description language in a user space and the traps for the region are represented in a device space, the method further comprising:
mapping the traps from device space to user space and adding the mapped traps to the page description language representation of the electronic document.
13. (Original) The method of claim 4, wherein:
the asymmetric transformation maps a resolution-independent representation of the region into a resolution-independent representation of the transformed region;
a vector-based trapping engine processes the transformed region to generate transformed traps represented as vectors; and
the inverse transformation maps the transformed traps represented as vectors to a device space.
14. (Original) The method of claim 13, further comprising performing pecker detection and removal in device space before applying the asymmetric transformation.
- 15-17. (Cancelled)

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 5 of 11

Attorney's Docket No.: 07844-311001 / P287

18. (Currently amended) A computer program product, tangibly stored on a computer-readable medium, for preparing a region of an electronic document for printing on a printing system having asymmetric misregistration behavior by trapping the region asymmetrically to compensate for asymmetric misregistration behavior of a printing system, comprising instructions operable to cause a computer to: ~~The product of claim 15, further comprising instructions to:~~

- define an asymmetric transformation;
- apply the asymmetric transformation to the region to generate a transformed region;
- process the transformed region to generate transformed traps; and
- apply an inverse transformation to the transformed traps to generate traps for the region, the inverse transformation being an inverse of the asymmetric transformation.

19. (Original) The product of claim 18, wherein the asymmetric transformation is defined as a transformation matrix and the inverse transformation is defined as a matrix inverse of the transformation matrix.

20. (Original) The product of claim 18, wherein the instructions to define the asymmetric transformation comprise instructions to:

- obtain a first trap width magnitude and direction, the first trap width being a minimum trap width for the printing system;
- obtain a second trap width magnitude and direction, the second trap width being a maximum trap width for the printing system;
- define a rotational component of the asymmetric transformation by determining an angle by which a first axis of a device space has to be rotated to be aligned with the first trap width direction; and
- define a scaling component of the asymmetric transformation according to a ratio of the first trap width magnitude and the second trap width magnitude.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 6 of 11

Attorney's Docket No.: 07844-311001 / P287

21. (Original) The product of claim 20, wherein the electronic document is represented in a page description language in a user space and the traps for the region are represented in a device space, the product further comprising instructions to:

map the traps from device space to user space and add the mapped traps to the page description language representation of the electronic document.

22. (Original) The product of claim 20, wherein the first trap width direction and the second trap width direction are at right angles to each other.

23. (Original) The product of claim 20, wherein defining the asymmetric transformation maps a first trap width vector and a second trap width vector to orthonormal basis vectors of a trap-engine space.

24. (Original) The product of claim 18, wherein processing the transformed region to generate transformed traps is done by a trap engine generating symmetric traps in a trap-engine space.

25. (Original) The product of claim 18, wherein the step of applying the inverse transformation maps the transformed traps from a trap-engine space to a device space.

26. (Original) The product of claim 18, wherein the electronic document is represented in a page description language in a user space and the traps for the region are represented in a device space, the product further comprising instructions to:

map the traps from device space to user space and add the mapped traps to the page description language representation of the electronic document.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 7 of 11

Attorney's Docket No.: 07844-311001 / P287

27. (Original) The product of claim 18, wherein:
the asymmetric transformation maps a resolution-independent representation of the region into a resolution-independent representation of the transformed region;
a vector-based trapping engine processes the transformed region to generate transformed traps represented as vectors; and
the inverse transformation maps the transformed traps represented as vectors to a device space.
28. (Original) The product of claim 27, further comprising performing pecker detection and removal in device space before applying the asymmetric transformation.
- 29-30. (Cancelled)
31. (New) A system comprising:
a printing system having asymmetric misregistration behavior;
means for defining an asymmetric transformation;
means for applying the asymmetric transformation to a region of a document to generate a transformed region;
means to process the transformed region to generate transformed traps; and
means to apply an inverse transformation to the transformed traps to generate traps for the region, the inverse transformation being an inverse of the asymmetric transformation.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 8 of 11

Attorney's Docket No.: 07844-311001 / P287

32. (New) A method comprising:
receiving device information for a printing device having asymmetric resolution, the device information describing the asymmetric resolution;
using the device information to generate traps;
applying the traps to a region of an electronic document.
33. (New) The method of claim 32, wherein generating traps comprises:
defining an asymmetric transformation;
applying the asymmetric transformation to the region to generate a transformed region;
processing the transformed region to generate transformed traps; and
applying an inverse transformation to the transformed traps to generate traps for the region, the inverse transformation being an inverse of the asymmetric transformation.
34. (New) The method of claim 33, wherein defining the asymmetric transformation comprises:
defining a device component of the asymmetric transformation based on the asymmetric resolution of the printing device.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 9 of 11

Attorney's Docket No.: 07844-311001 / P287

35. (New) The method of claim 34, wherein defining the asymmetric transformation further comprises:

- obtaining a first trap width magnitude and direction, the first trap width being a minimum trap width for the printing system;

- obtaining a second trap width magnitude and direction, the second trap width being a maximum trap width for the printing system;

- defining a rotational component of the asymmetric transformation by determining an angle by which a first axis of a device space has to be rotated to be aligned with the first trap width direction; and

- defining a scaling component of the asymmetric transformation according to a ratio of the first trap width magnitude and the second trap width magnitude.

36. (New) A computer program product, tangibly stored on a computer-readable medium, comprising instructions operable to cause a computer to:

- receive device information for a printing device having asymmetric resolution, the device information describing the asymmetric resolution;

- use the device information to generate traps;

- apply the traps to a region of an electronic document.

- trap the region asymmetrically to compensate for asymmetric misregistration behavior of the printing system wherein trapping the region asymmetrically compensates for asymmetric resolution of the printing system.

Applicant : Dermer et al.
Serial No. : 09/458,565
Filed : December 9, 1999
Page : 10 of 11

Attorney's Docket No.: 07844-311001 / P287

37. (New) The product of claim 36, wherein the instructions to generate traps comprise instructions to:

define an asymmetric transformation;

apply the asymmetric transformation to the region to generate a transformed region;

process the transformed region to generate transformed traps; and

apply an inverse transformation to the transformed traps to generate traps for the region, the inverse transformation being an inverse of the asymmetric transformation.

38. (New) The method of claim 37, wherein the instructions to define the asymmetric transformation comprise instructions to:

define a device component of the asymmetric transformation based on the asymmetric resolution of the printing device.

39. (New) The method of claim 38, wherein the instructions to define the asymmetric transformation further comprise instructions to:

obtain a first trap width magnitude and direction, the first trap width being a minimum trap width for the printing system;

obtain a second trap width magnitude and direction, the second trap width being a maximum trap width for the printing system;

define a rotational component of the asymmetric transformation by determining an angle by which a first axis of a device space has to be rotated to be aligned with the first trap width direction; and

define a scaling component of the asymmetric transformation according to a ratio of the first trap width magnitude and the second trap width magnitude.